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Cover picture:- SA-9 SAM

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FOREWORD

The first article in this Review describes the central tyre inflation system that is used on a wide range of Soviet vehicles. The system is simple and yet it greatly increases the ability of their wheeled vehicles over soft, difficult terrain. It is of interest that although the Soviet forces have used the system successfully for some time it is an innovation that has not been used by Western forces since its appearance on the amphibious DUKW of World War II vintage.

The TMS-65 decontamination vehicle is also an equipment which is unique to the Warsaw Pact forces. It illustrates the importance the Pact places upon the ability to continue operations under NBC conditions.

The theme of mobility is also evident in an unusual APC, the tracked Artillery Tractor/APC M-1970, the Soviet Engineer Tractor M-1972 and the Polish rocket projected explosive mine clearing equipment that appeared mounted on T-55s on the 1974 Warsaw Parade.

Also seen on that parade was the SA-9 SAM system that we now know to be yet another SAM system in its own right and not a vehicle mounted SA-7 as was originally thought.

Finally the Review describes the R-104M HF radio set, a modified version of the R-104.

T. B. PALMER
Colonel TECH INT(A)

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1. Central Tyre Inflation System

Soviet vehicles have for many years achieved significant improvements in mobility by the use of a central tyre inflation system (CTIS). With such a system a driver is able to vary the tyre pressure to suit the terrain without stopping the vehicle.

A central tyre inflation system was first introduced by the Americans in World War II in an amphibious truck. The earliest and crudest example of Soviet work in that field was the BTR-152 with its external air pipes (Fig 1).

Fig 1. BTR-152 with external CTIS

Today there are two basic types of CTIS in service in the Warsaw Pact. The earlier type (Fig 2), first introduced on the ZIL-157 in 1958, has a separate control valve for each tyre and the driver can hence vary the pressure of each tyre individually. The later type (Fig 3) is of much simpler design. It utilizes a single control valve with which the driver can vary all the tyre pressures by the same amount but cannot adjust the pressure of each tyre separately. The GAZ-66 2 ton, ZIL-131 3½ ton, URAL-375 4½ ton and KrAZ-255B 8 ton trucks use this latter system.

Each tyre uses a slip ring assembly as the sealing device through which to pass air from a stationary tube into a revolving passageway or vice versa. In the earlier type the slip ring assemblies are fitted to the end of the axle housings (Fig 4) but in the later type they are fitted to the wheel hubs (Fig 5). Although more easily removed the earlier type slip rings are more vulnerable, have a shorter life and require more maintenance that the later type. Experience has shown the CTIS to be highly reliable. A selection of wheels with CTIS attachments is shown in Figs 6–10.

The effect of this system is to give the Soviets, and to a lesser extent the Warsaw Pact motor transport fleet, a higher level of mobility than NATO wheeled vehicles in general. This advantage has been gained because of advances in Soviet technology in a field which has not been utilised in the West for almost thirty years.

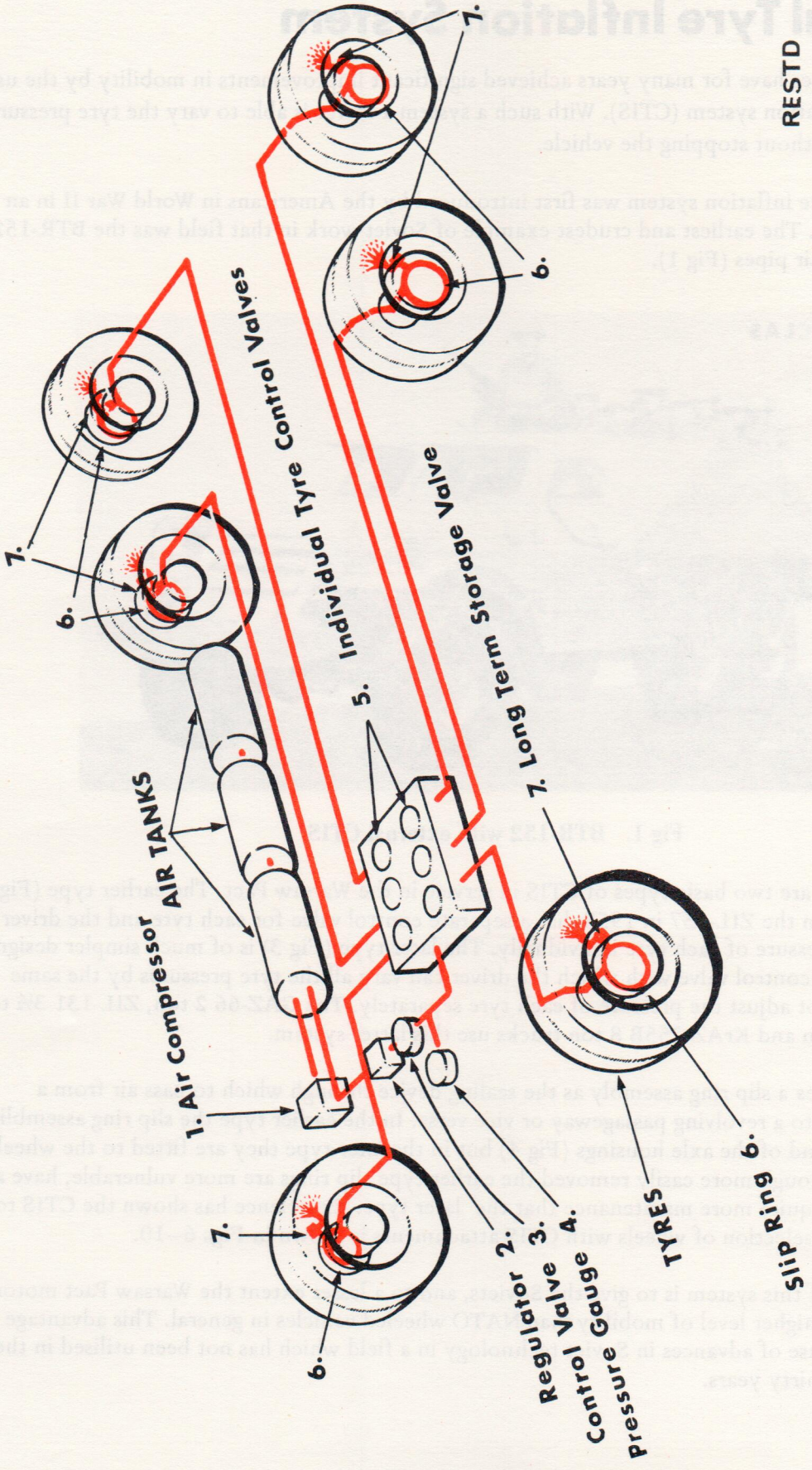

Fig 2. Soviet ZIL-157 Tyre Inflation System

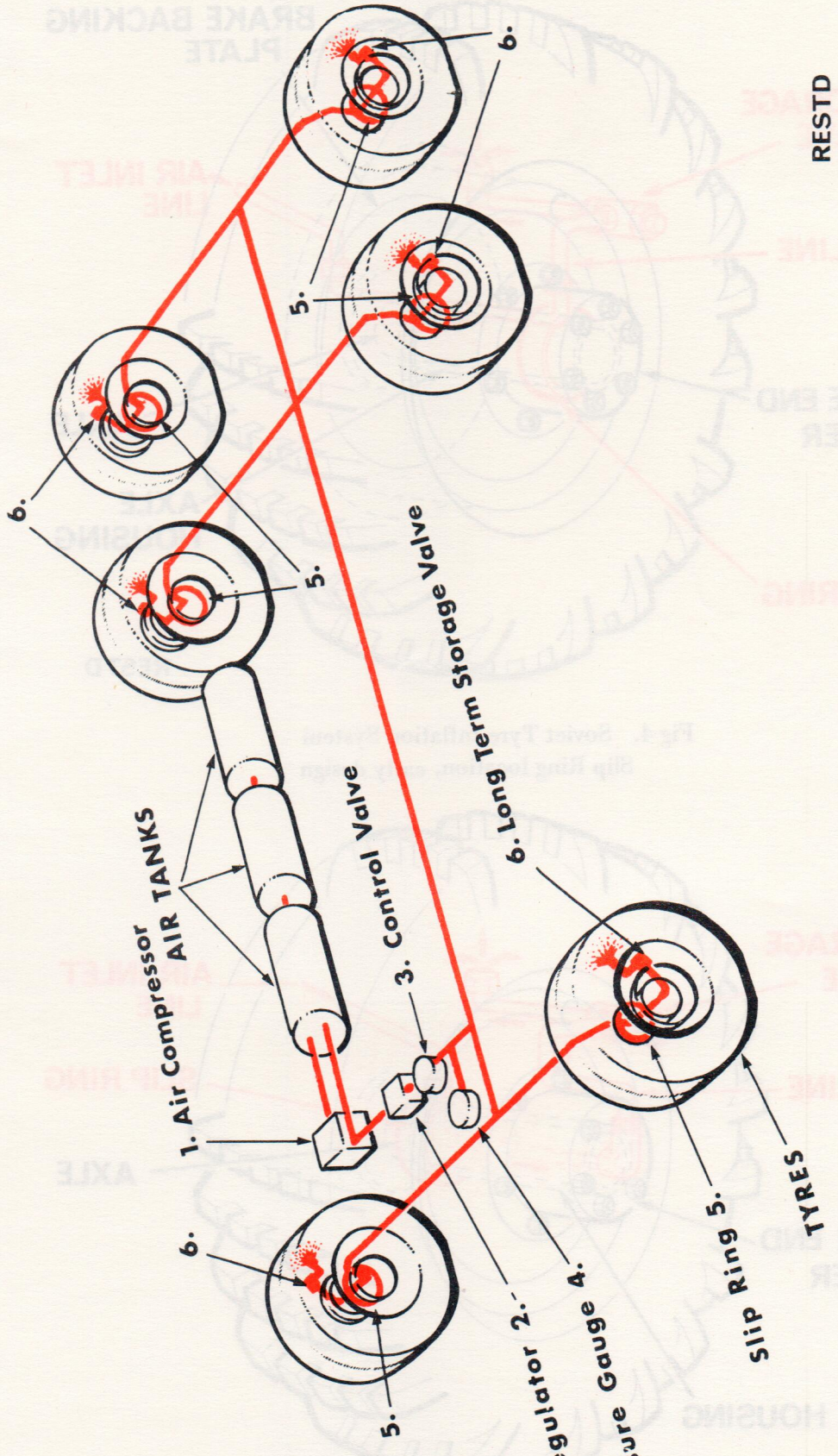

Fig 3. Soviet ZIL-131 Tyre Inflation System

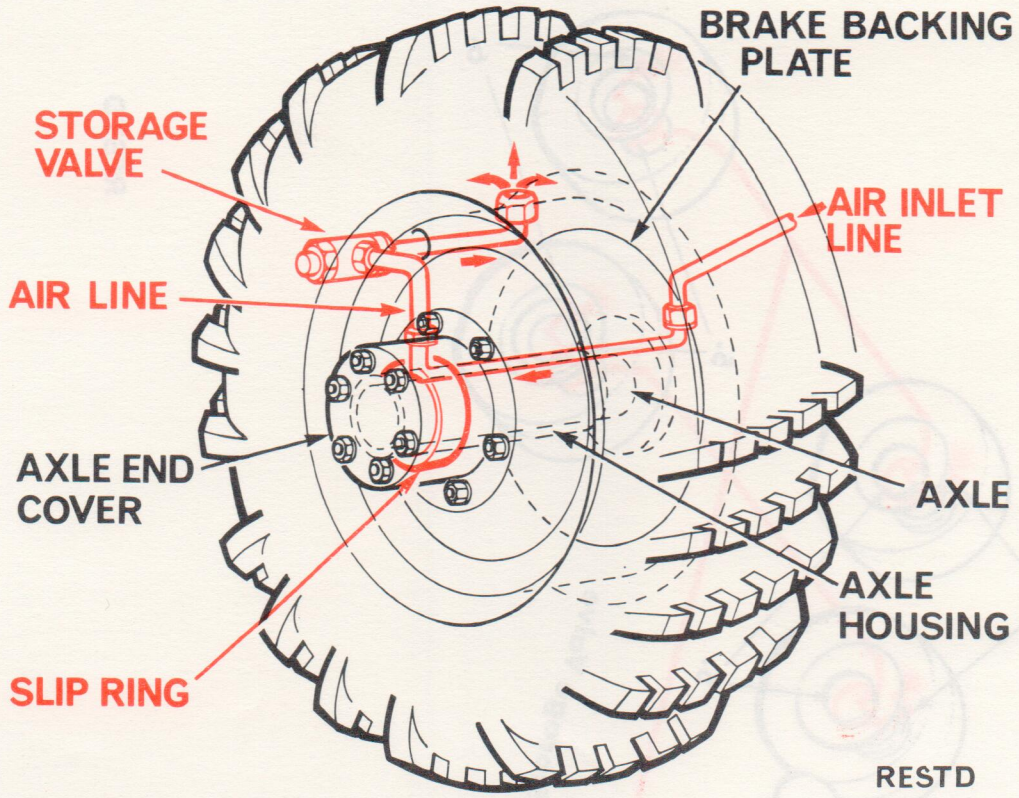

Fig 4. Soviet Tyre Inflation System
Slip Ring location, early design

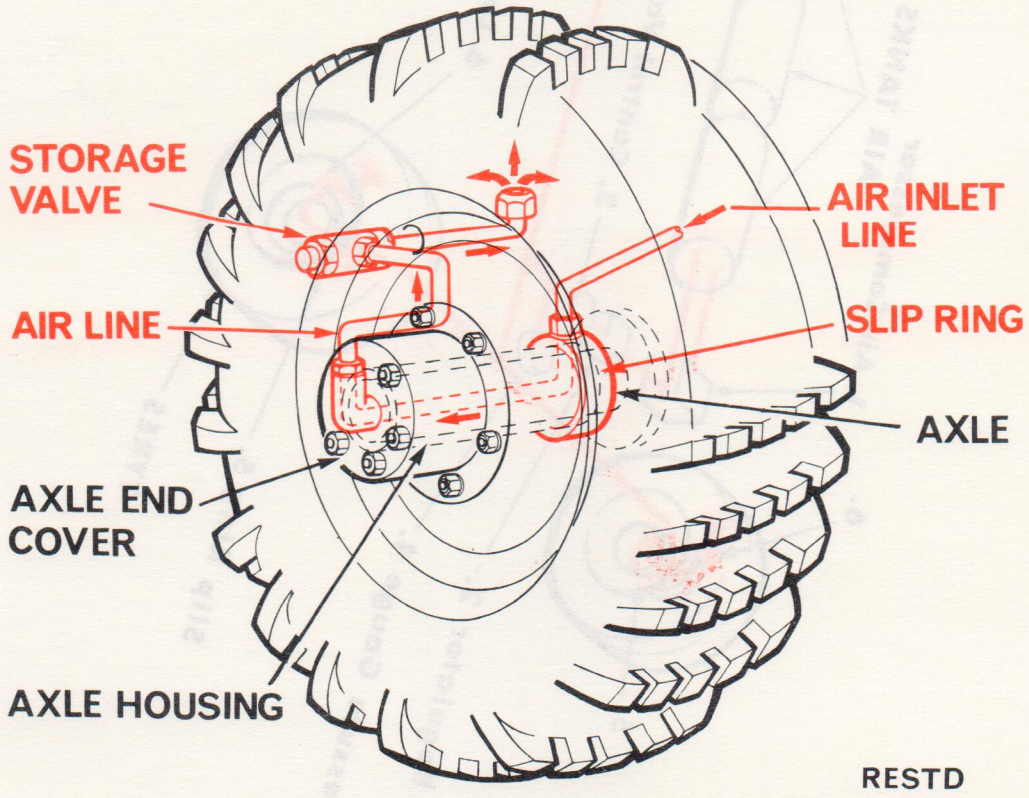

Fig 5. Soviet Tyre Inflation System
Slip Ring location, current design

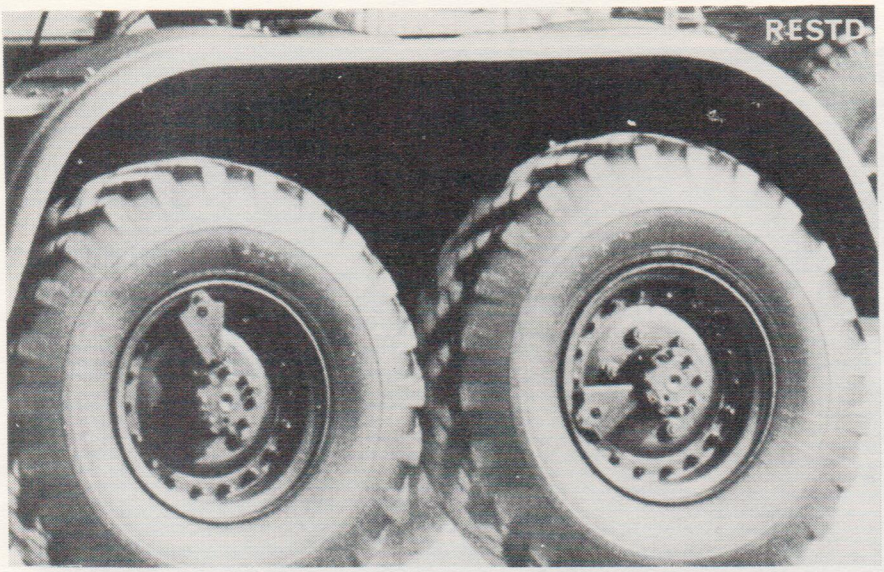

Fig 6. ZIL-157 with Earlier Type CTIS

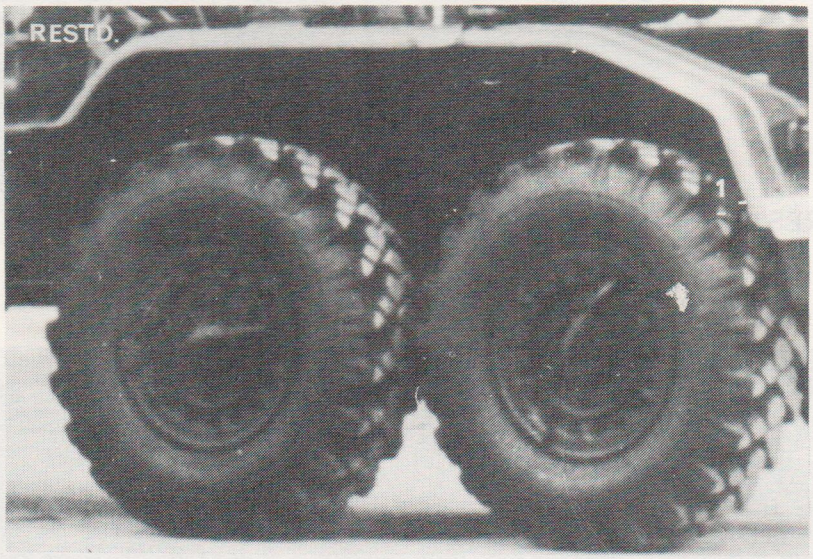

Fig 7. ZIL-131 with Later Type CTIS

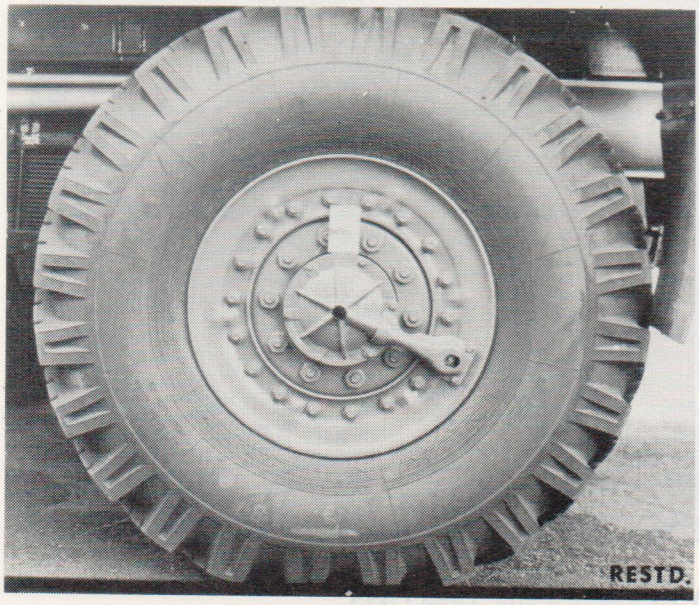

Fig 8. URAL-375 with Later Type CTIS

Fig 9. KrAZ-255B with Later Type CTIS

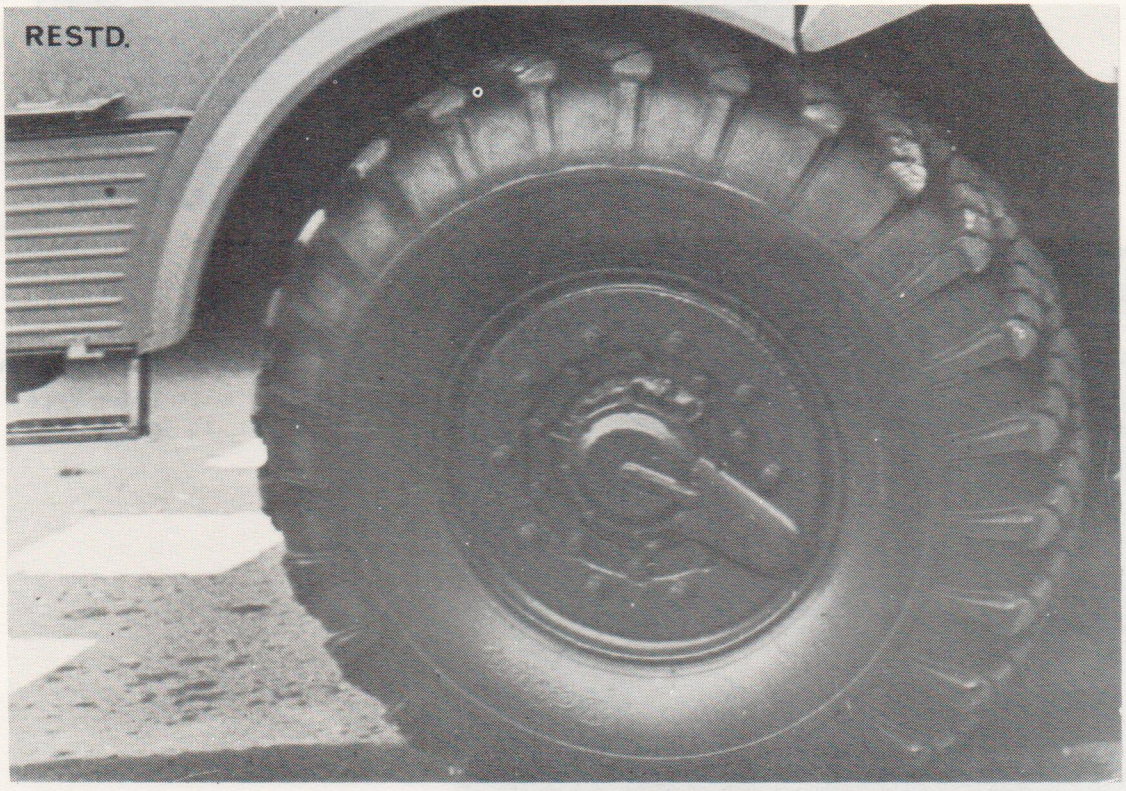

Fig 10. TATRA-813 with Later Type CTIS

2. TMS-65

General. A unique vehicle in the Warsaw Pact is held by Soviet chemical defence battalions. It is a rapid decontamination device, the TMS-65 (Fig 1). It consists of a jet engine mounted on a truck and is designed to blow hot air, steam or a hot spray of decontaminant at a tank, APC or other contaminated vehicle. The TMS-65 has been in service for some time and was described in the Soviet military press in 1969.

Fig 1. TMS-65 Rapid Decontamination Device

Description. The TMS-65 is usually mounted on the URAL-375E 6 x 6 4½ ton vehicle although there have been reports of it mounted on the URAL-377. The jet engine is the Soviet VK-1A, (Fig 2) a copy of the Rolls Royce Nene, and it was originally fitted to the MiG-15 and MiG-17. It can be moved in the vertical and horizontal planes hydraulically. The control cabin is hermetically sealed to allow the operator to work without a respirator and is equipped with a windscreen wiper and floodlights for operation in bad weather and at night. Between the engine and the driver's cab are two tanks, one containing kerosene fuel and the other, water or decontaminant.

Fig 2. Soviet VK-1A Jet Engine for TMS-65

A tube from the latter tank is connected to an annular tube around the exhaust of the jet (Fig 3) from which four tubes lead through the exhaust wall, thus allowing the injection of water or decontaminant solution into the exhaust stream.

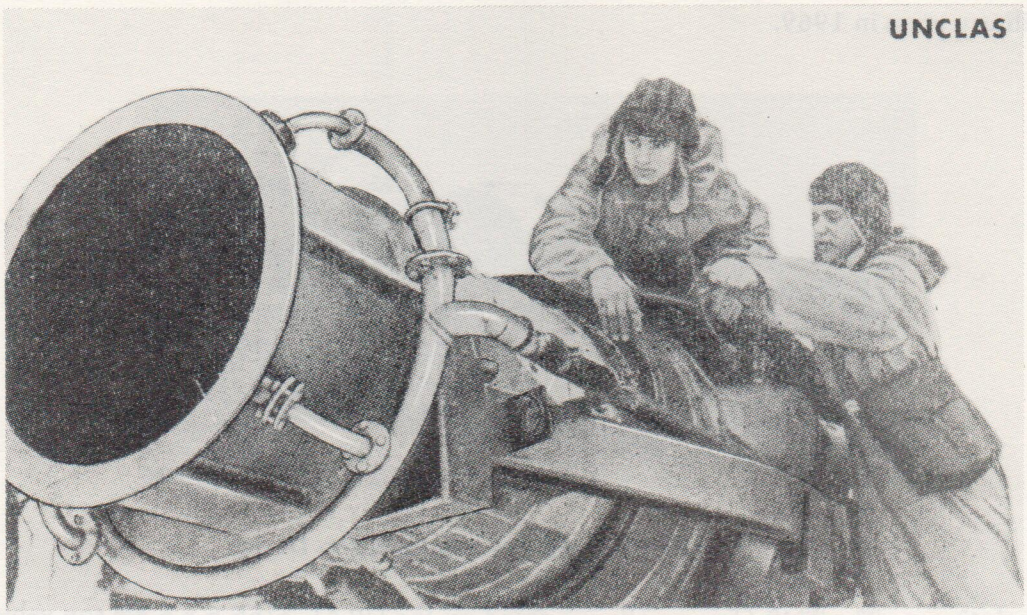

Fig 3. Annular Tube around jet engine for liquid injection into exhaust

Operation. The TMS-65 can be used for three purposes:

a. Degasification using the hot exhaust gases only to evaporate or drive off chemical agent contamination.

b. Deactivation using an intermittent injection of water into the exhaust to remove radiological contamination in the form of dust or fall-out particles (Fig 4).

c. Disinfection using an injection of disinfectant solution or slurry into the exhaust to destroy biological agents.

Fig 4. TMS-65s in operation

TMS-65s are operated in pairs normally in association with either the 4200 litre trailer PTs-4.2-754V or the ARS-14 bowser. The TMS-65s operate on either side of a track separated laterally by up to 80 metres. A typical layout is shown diagrammatically at Fig 5. Vehicles to be decontaminated cross the start point and travel between the TMS-65s at a maximum speed of 3 km/h. The first TMS-65 treats the front and side of the vehicle and the second treats the other side and the rear. Up to forty vehicles an hour can be treated.

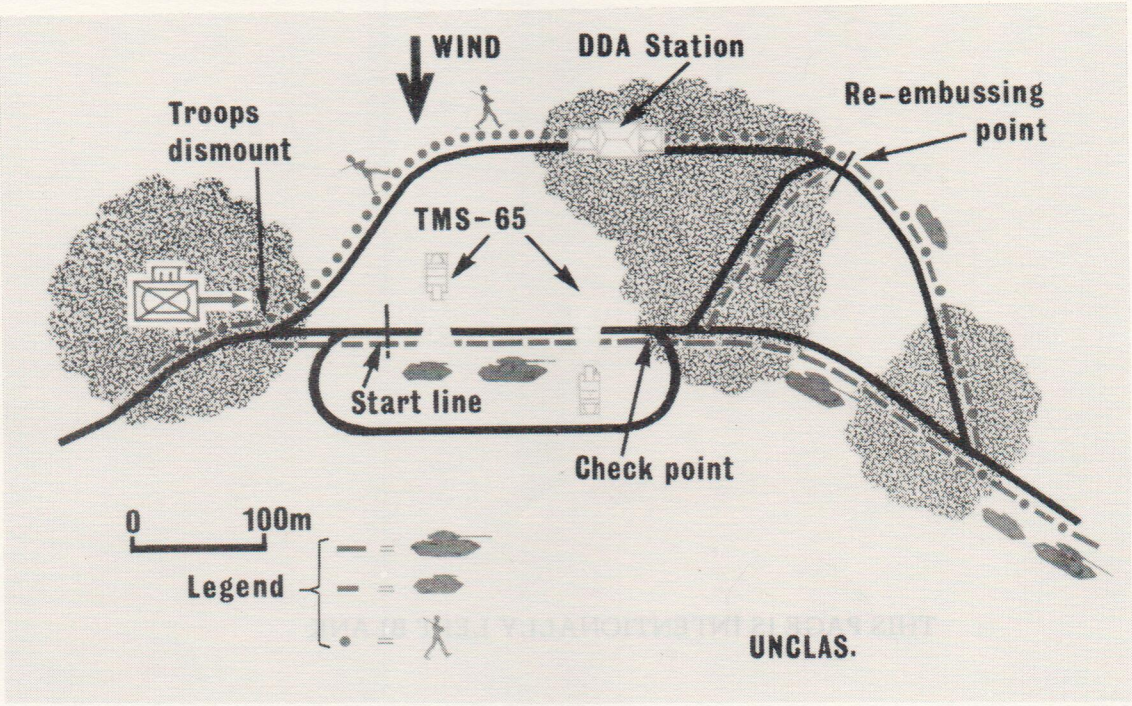

Fig 5. Typical Layout of TMS-65 in Operation

An alternative method of operation is to place the contaminated vehicles in a line and move the TMS-65s along on each side.

It is felt that the TMS-65 is unlikely to achieve very good degasification and its main role will be to deactivate radiologically contaminated AFVs. Its effectiveness as a disinfector will be governed by the strength of the disinfectant and the resistance of the biological agent and as a result, its efficiency in this role cannot be assessed.

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3. Tracked Artillery Tractor/APC M-1970

The tracked artillery tractor/APC (Fig 1) is a large, roomy, lightly armoured vehicle weighing some 12 tons and it is seldom seen outside the USSR. It is in many ways similar to the GT-T tracked load carrier and was originally thought to be a variant of this vehicle. There are two versions of the tractor/APC. The earlier one first seen in 1970 has wide tracks covered by small track guards which run the length of the vehicle. This version has a low ground pressure and is intended for use in snow or marshy areas. Our picture shows the later variant, seen first in 1974, which has a modern type of track and running gear also used on the new 122 mm SP gun. It has only a short track guard at the front, the remainder of the track being covered by the armoured hull overhang.

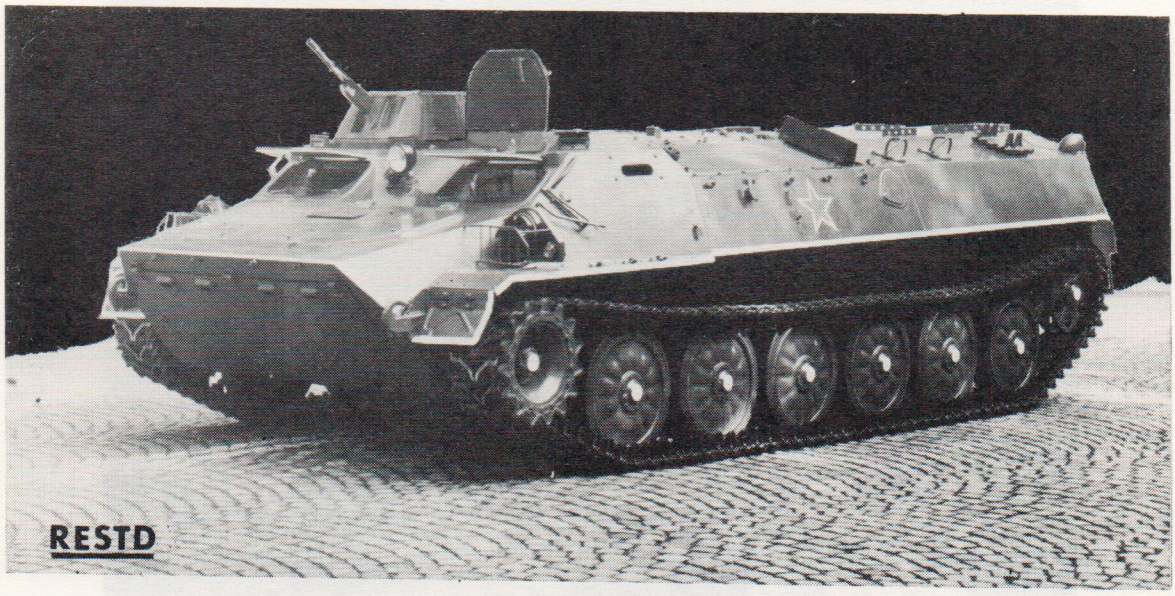

Fig 1. Tracked Artillery Tractor/APC M-1970

The vehicle swims with little preparation and is propelled in the water by its tracks. Two sets of vanes hinge down behind the tracks to assist with propulsion and steering in the water. Entry and exit for the passengers is by two large doors at the rear. It is powered by a diesel engine of about 300 bhp.

The tractor/APC has a small manually operated turret on the front right corner in which is mounted a 7.62 mm machine gun. One firing port is provided on each side of the vehicle and one in each of the rear doors for infantry weapons.

The vehicle has two distinctive roles. It is used as a gun tractor for towing the D-30 or D-1 field gun providing plenty of room inside for the gun section and some ready use ammunition. It is also used as an APC and it is estimated that 10 fully equipped infantrymen can be carried in addition to a crew of three.

4. Soviet Armoured Engineer Tractor M-1972

A constantly recurring theme in the Soviet Army's development of new equipment is improved mobility. From the engineer's point of view, this means an emphasis on rapid bridging and better obstacle clearing equipment so that the advance of their armoured forces is not held up.

The latest and most impressive Soviet obstacle clearing equipment or Inghenernaya Mashina Razgrazhdeniya (IMR) is the Armoured Engineer Tractor M-1972 (Fig 1).

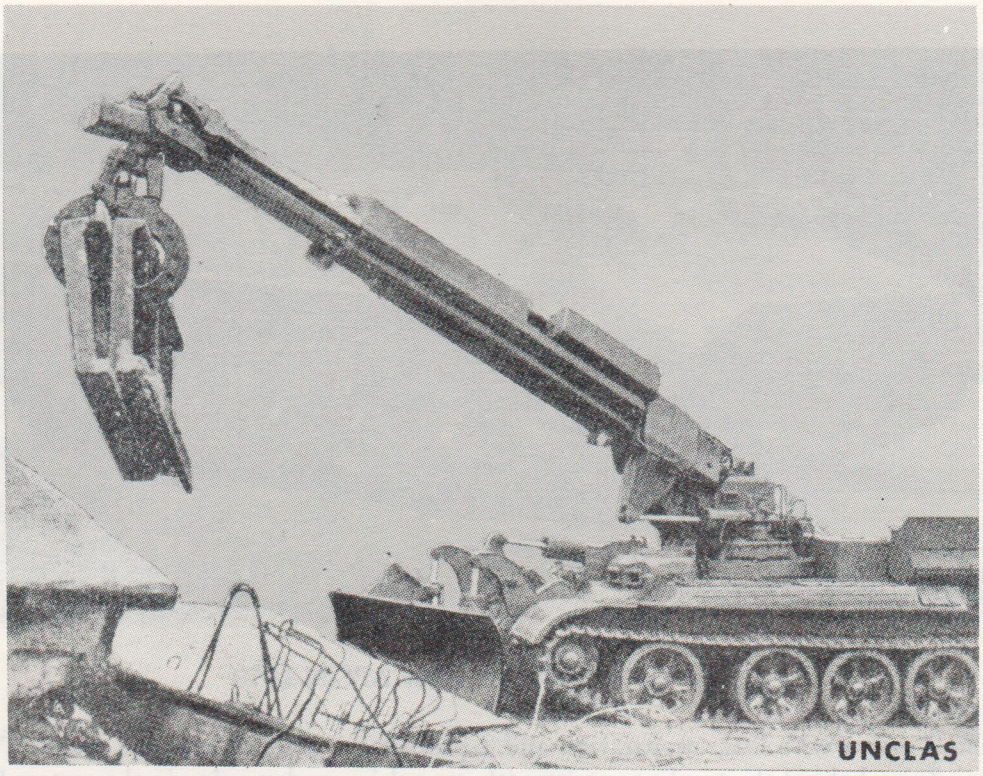

Fig 1. Soviet Armoured Engineer Tractor M-1972

This equipment is based on the hull of the Soviet T-54 medium tank. It has a hydraulically operated bulldozer blade, which can be adjusted for push-up, straight, angled or V configuration dozing; it is similar in appearance to the blade of the BAT-M dozer. A small armoured cupola at the front of the vehicle, on the left, provides the driver operator with good visibility and protection. A semi-armoured hydraulic crane is fitted in place of the normal tank turret and there is an armoured position for the crane operator. The crane at Fig 1 is fitted with a grab attachment but the tractor also appears to carry an excavating bucket above the left hand track at the rear.

This tractor is a very useful addition to the Soviet engineer inventory enabling him to operate under armour in forward areas. With its crane and attachments it will be of most value in route clearing and preparing exits and entrances along river banks.

5. Polish Rocket Projected Explosive Mine Clearance Equipment

Introduction

In 1970 and again in 1972 several Warsaw Pact countries screened television programmes of their joint exercises. Amongst other things shown was a Polish T-55 tank fitted with what appeared to be a rocket projected explosive mine clearing equipment. This equipment was not seen again until it appeared on the 1974 Warsaw Parade (Fig 1). There were seventeen such tanks on the parade and all of them were also fitted with the KMT-4 mine plough and a PSK marker dispenser cassette.

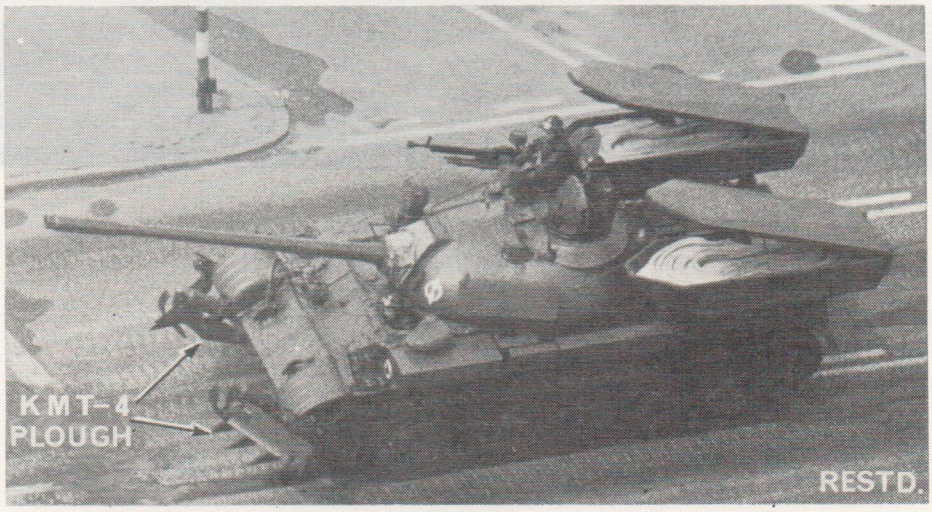

Fig 1. Polish Rocket Projected Mine Clearer

Description

Two coffin shaped boxes each containing an explosive line charge are mounted one on each side of the rear deck of the tank. It is clearly therefore a two shot device. These boxes are designed for fast fitting and removal.

Each explosive line charge is contained in a continuous hose assessed to be 120 m long and about 50 mm in diameter. Assuming that the operational hose is the same size as the drill hose carried on the parade then it could contain about 3 kg/m of a conventional plastic high explosive. The rockets to propel the hoses are mounted on the under-surface of the box lids (Fig 2) which can be set to a fixed elevation by means of struts. The rockets are 170 to 180 mm in diameter and about 1200 mm long; they have fixed fins and cone shaped noses.

Details of the operation of this equipment including stand off distances and the method of initiation are not yet known. It seems probable that the hose by itself could not be relied upon to clear all the mines from the path of the tank. It is therefore likely that it is designed to complement the mine plough fitted to the tank by clearing tilt fuzed mines and other belly attack mines in the un-cleared area between the ploughs.

Fig 2. Polish Rocket Projected Mine Clearer with PSK Marker Dispenser

6. The SA-9 SAM System

Introduction

The SA-9 is a vehicle mounted low level SAM system now deployed with the Soviet and other Warsaw Pact Ground Forces, (Fig 1)

Description

The GASKIN missiles are mounted on a modified BRDM-2 armoured amphibious reconnaissance vehicle (Figs 1 & 2). The standard BRDM-2 turret has been replaced by a pedestal upon which the missile mounting framework is fitted. The complete framework rotates within what appears to be the standard turret ring. There is a rectangular window in the forward base of the pedestal mounting through which the operator views the target. No optical device has so far been identified to assist in acquisition and tracking, nor is it certain how any early warning information is passed to the operator. Up to four missile canisters each containing one missile may be slung under the missile launch framework.

Fig 1. SA-9 (GASKIN)

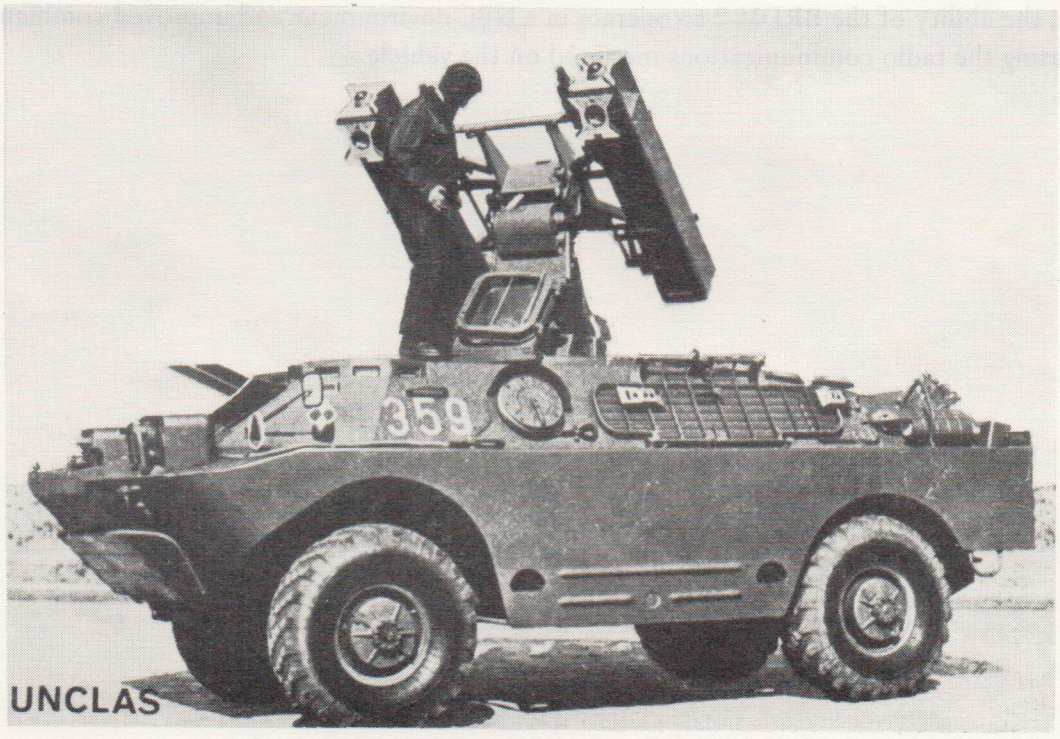

Fig 2. SA-9 with two missile canisters fitted

Fig 3. SA-9 in Travelling Mode

The missile launch framework and missile canisters may be lowered for travelling (Fig 3), and frames positioned on each side of the BRDM-2, towards the rear of the hull, are used to protect the missile canisters.

Performance

The GASKIN missiles of SA-9 are considered to be infra red homing missiles, similar to, but larger and probably more sophisticated than the GRAIL missile used in the SA-7 man-portable SAM system. Consequently the SA-9 system is assessed as having an improved performance over SA-7. It will be a threat to helicopters and slow fixed wing aircraft, and may well have some effectiveness against high speed fixed wing aircraft.

Other advantages of the SA-9 system when compared with SA-7 are better protection for the operator, the ability of the BRDM-2 to operate in a NBC environment and improved command and control using the radio communications mounted on the vehicle.

7. R-104 M HF Radio Set

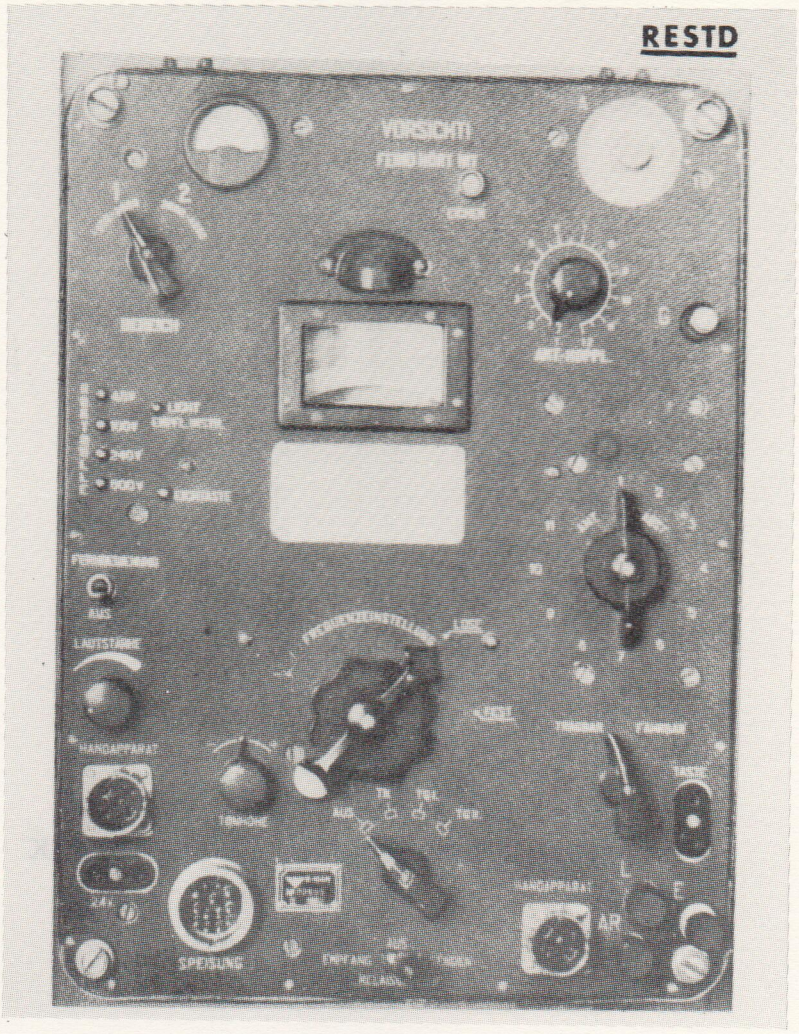

Fig 1. R-104M HF Radio Set

The R-104M is a modernised version of the R-104 HF radio set. It has an increased frequency range and a higher power output, and incorporates transistors in its design.

It is a low power, general purpose radio used by the USSR, East Germany and probably other Warsaw Pact countries. The R-104M can be either man-portable or vehicle mounted. It has facilities for both voice and morse operation and re-transmission is possible using either another R-104M or any of the R-105 family of VHF sets.

Technical Characteristics

Frequency Range	:	1.5–4.25 MHz
Power Output	:	Voice – Vehicle Mounted 10 Watts. Portable 1 Watt Morse – Vehicle Mounted 20 Watts. Portable 3.5 Watt
Power Source	:	Two 2-NKN-24 and Two 2-NKN-45 batteries.
Antennae	:	Whip, dipole and long wire. The mounted version also has a telescopic mast.

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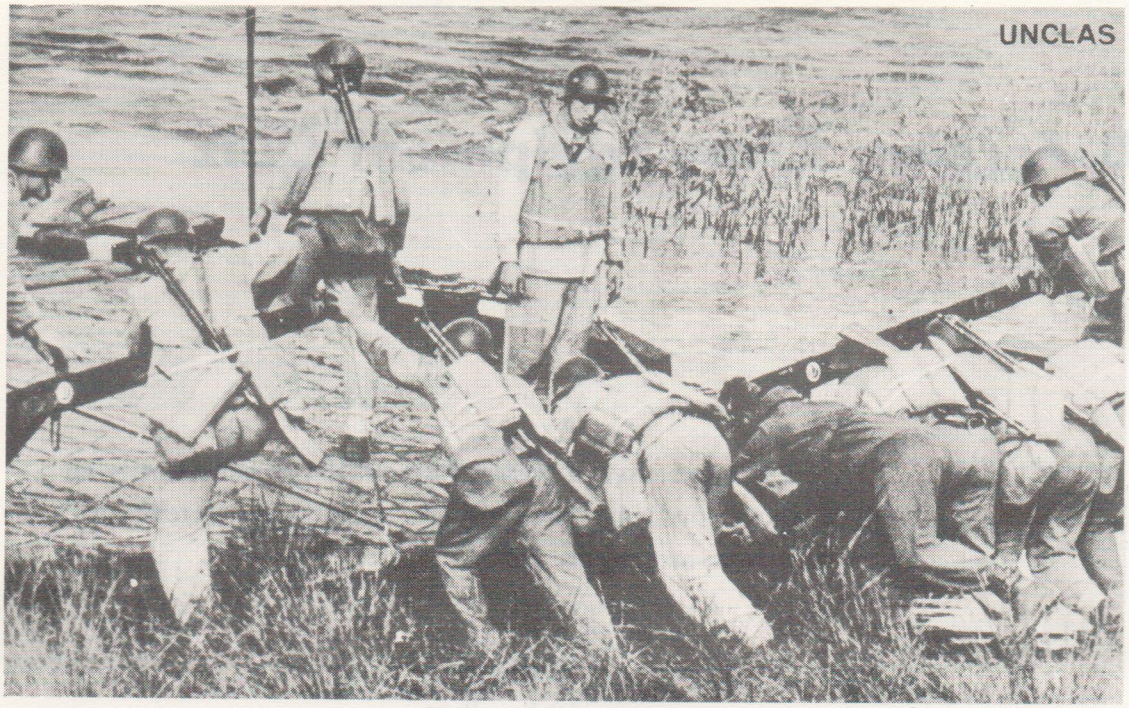
Its Back!

8. Foreign Army Equipment Quiz

A bumper crop of teasers for you. If you can identify all these you must have a high IQ in Army Intelligence. Answers are on page 26.

Scoring – 11 Brilliant
10 Excellent
9 Very Good
8 Good
7 Fair
6 – better swat up on some of our ATIRs.

1. A New Vehicle for Dr Doolittle?

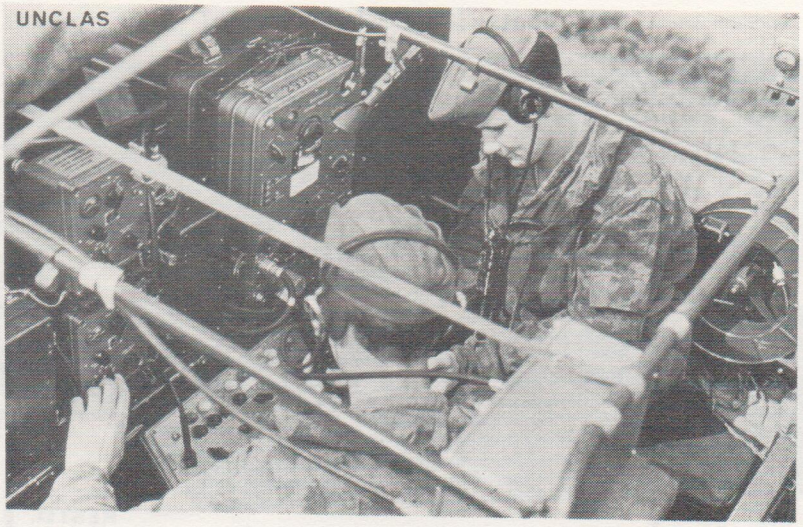


2. "And again so – lift up"; but what?

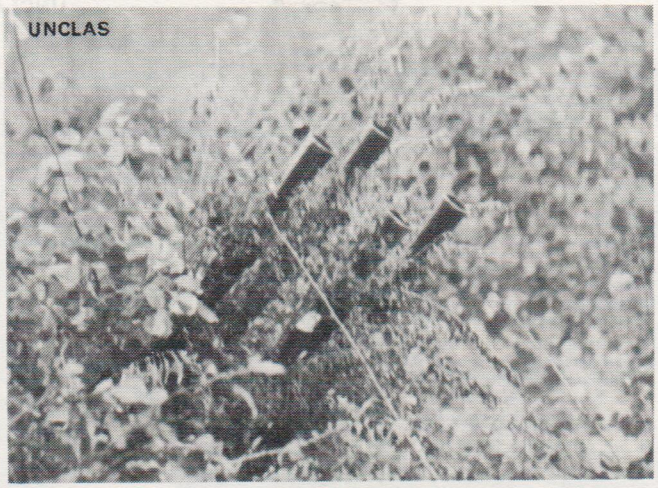
3. A common vehicle in an unusual disguise –
Can you recognise it?

4. You push the middle valve down – and what do you get? If you have read this Review you should know.

5. What gun is this, and how does it usually move?



6. Behind bars, but where and what is the set? We've published this before from a different angle.



7. If you can see this you're too close – but having got so far – what is it?

8. Do you know what they keep under the cover? If you do, what is it and what is its use?

9. Which way did it go? Work that out and you'll know what it is.

10. Better safe than sorry — what could it be?

11. What is it? The helicopter, not the vehicle

Foreign Army Equipment Quiz

Answers

1. URAL-375s passing
2. Launching PMP
3. BTR-60PU
4. Front end of Armoured Engineer Tractor – M1972
5. 85mm Auxiliary Propelled Anti-Tank Gun.
   To provide local battlefield mobility it has an auxiliary propulsion unit.
6. R-125M Radio Station in UAZ-69, also shown from another angle in ATIR No 104.
7. 14.5 mm ZPU-4
8. TWIN BOX – Intercept Equipment
9. T-62 with turret trained to the rear.
10. TM-46 Anti-Tank Mine with MVM fuze or – TMN-46 with a secondary anti-lift booby trap fuze in its base.
    No indication at this stage of clearance.
11. Mi-8 – HIP